

Application No.: 09/687020

Case No.: 55202US002

REMARKS

Claims 1-18 and 20-31 are pending. Claims 1 and 20 have been amended to further clarify that the abrasive articles are free of abrasive particles. Support for the amendment can be found in the specification and original claims, for example, see Figs. 2-5, Examples 1-4 on pages 30-32, and original claims 19 and 32.

Fig. 3 has been amended to correct an apparent error in the lead line for reference numeral 38. It is readily apparent from the specification that the lead line for binder 38 should extend through diamond-like carbon coating 37. Support for this amendment can be found in the specification, for example, on page 10, line 29, through page 11, line 13, and in Fig. 4, where binder 48 is shown.

The Patent Office's interpretation of the previously amended claims did not require that the abrasive article be free of abrasive particles. This broad claim interpretation formed the basis for the Patent Office's rejections. Although Applicants do not necessarily agree with the Patent Office's claim interpretation, Applicants have amended claims 1 and 20 to further make clear that the abrasive article is free of abrasive particles. No change in claim scope is intended. Applicants respectfully submit that the amendment places the application in condition for allowance or better form for appeal.

I. Claims 1-5, 7-14, 18, 20-27, and 31 are Novel over Holmes

Claims 1-5, 7-14, 18, 20-27, and 31 stand rejected under 35 USC § 102(b) as being anticipated by Holmes et al. (U.S. Pat. No. 5,690,705). Applicants respectfully request reconsideration of this rejection because Holmes does not teach or suggest "an abrasive article that is free of abrasive particles" as recited in Applicants' claims.

As recognized in the Office Action at paragraph 6, Holmes discloses an embodiment that has precisely shaped abrasive particles that are free of abrasive grits. However, grits are bonded to the backing in Holmes when the precisely shaped particles are free of abrasive grits (column 15, lines 13-19). Thus, Holmes includes grits in the precisely shaped abrasive particles or bonded to the backing. Holmes does not teach or suggest "an abrasive article that is free of abrasive particles" as recited in Applicants' claims. Thus, the rejection of claims 1-5, 7-14, 18,

Application No.: 09/687020

Case No.: 55202US002

20-27, and 31 under 35 USC § 102(b) as allegedly being anticipated by Holmes should be withdrawn.

II. Claims 1-18 and 20-31 are Not Obvious

A. Claims 1-18 and 20-31 are Not Obvious in view of Stubbs and Martin

Claims 1-18 and 20-31 stand rejected under 35 USC § 103(a) as allegedly being obvious over Stubbs et al. (U.S. Pat. No. 6,277,160) in view of Martin et al. (U.S. Pat. No. 5,551,959). Applicants respectfully request reconsideration of this rejection because there is no motivation to select the abrasive article of Stubbs that is free of abrasive particles and modify it by adding a diamond-like carbon coating.

Stubbs reports a method for making an abrasive article having at least two coatings having different abrasive natures. In one embodiment, the article does not include abrasive particles. As acknowledged in the Office Action, Stubbs does disclose a diamond-like carbon coating. Rather, Stubbs utilizes abrasive particles or the binder itself to perform the abrading.

The Office Action supplements the deficiency of Stubbs with Martin and its reported teachings concerning the use of diamond-like carbon coatings for abrasive articles. Applicants' claimed inventions use the diamond-like carbon coating as the abrading agent. Significantly, the diamond-like carbon coating reported by Martin is not used as the abrading agent. Rather, the diamond-like carbon coating is used to improve the performance of the abrasive particles that perform the abrading.

An evaluation of the Examples reported in Martin clearly indicates that it is the abrasive particles that perform the abrading. For example, five of the six Examples reported in Martin include the diamond-like carbon coating as an intermediate layer adjacent to the abrasive particles. Unlike the other examples, Example 6 has the diamond-like carbon coating applied as a "top coat" away from the abrasive particles. A comparison of the results reported in Example 6 with Example 5 indicates that the diamond-like carbon coating enhances the cutting performance of the abrasive article significantly more when it is used as an intermediate layer adjacent to the abrasive particles rather than as a top coat apart from the abrasive particles. The results of the Examples presented in Martin, especially Example 6, suggest, if anything, that the diamond-like carbon coating should not be used apart from the abrasive particles when attempting to improve

Application No.: 09/687020

Case No.: 55202US002

cutting performance. Accordingly, Martin does not teach or suggest the desirability of combining a diamond-like carbon coating with an abrasive article that is free of abrasive particles.

Further, there is no suggestion in Stubbs of a deficiency with respect to cut rate. If one skilled in the art was motivated to increase cut rate, Stubbs teaches them to include abrasive particles in the article. That is, if one of skill in the art desired an increase in cut rate, they would not select an article without abrasive particles and then attempt to increase the cut rate by adding a diamond-like carbon coating. Rather, higher cut rates would be achieved by selecting embodiments of Stubbs that include abrasive particles.

In summary, there is no motivation to select the abrasive article of Stubbs that is free of abrasive particles and modify it by adding a diamond-like carbon coating. Neither Stubbs nor Martin teach or suggest that diamond-like carbon coatings can be used as the abrading agent. Accordingly, the rejection of claims 1-18 and 20-31 under 35 USC § 103(a) as allegedly being obvious over Stubbs in view of Martin should be withdrawn.

B. Claims 1, 2, 5-18, and 20-31 are Not Obvious in view of Martin and Stoetzel

Claims 1, 2, 5-18, and 20-31 stand rejected under 35 USC § 103(a) as allegedly being obvious over Martin in view of Stoetzel (U.S. Pat. No. 5,928,394). Applicants respectfully request reconsideration of this rejection because there is no motivation to modify the abrasive article of Martin by eliminating the abrasive particles.

Martin reports that diamond-like carbon coatings can improve the performance of the abrasive containing abrasive particles. Martin, however, does not teach or suggest the desirability of combining a diamond-like carbon coating with an abrasive article that is free of abrasive particles. Further, as discussed above, the Examples in Martin suggest that the diamond-like carbon coating should not be used apart from abrasive particles when attempting to improve cutting performance.

The Office Action supplements the deficiency of Martin with Stoetzel and its reported teachings concerning abrasive articles adapted for polishing "soft" workpieces. As recognized in the Office Action, Stoetzel states that it is "generally preferred to incorporate abrasive particles" except in certain instances involving "soft" workpieces (Stoetzel, col. 8, lines 1-8). Martin,

Application No.: 09/687020

Case No.: 55202US002

however, is concerned with increasing the cutting performance of an abrasive article having abrasive particles by adding a diamond-like carbon coating. One of skill in the art would likely eliminate the diamond-like carbon coating, not the abrasive particles, to reduce the cutting performance of an article disclosed by Martin. Alternatively, one of skill in the art might vary the size, type, and/or density of abrasive particles when polishing "soft" workpieces using an abrasive article disclosed by Martin. The cited combination of references simply does not teach or suggest removing the abrasive particles from the abrasive article disclosed by Martin.


In summary, there is no motivation to modify the abrasive article of Martin by eliminating the abrasive particles. Accordingly, the rejection of claims 1, 2, 5-18, and 20-31 under 35 USC § 103(a) as allegedly being obvious over Martin in view of Stoetzel should be withdrawn.

III. Conclusion

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration of the application is requested. The Examiner is invited to contact Applicants' undersigned representative with any questions concerning Applicants' application

Respectfully submitted,

January 21, 2004
Date

By: 
Daniel D. Biesterveld, Reg. No.: 45,898
Telephone No.: 651/737-3193

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833